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(72) Inventors LOUIS ANGE PIRSCH,
GIAN-FRANCO SCHUBIGER and
WALTER ROSTAGNO

(54) CHOCOLATE PRODUCT AND PROCESS

(71) We, NESTLE'S PRODUCTS LIMITED, of Nestle House, Collins Avenue, Nassau, Bahama Islands a company incorporated in the Bahama Islands, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with the production of heat resistant chocolate and confectionery products.

Chocolate products are thorough mixtures of cocoa, cocoa butter, sugar, optionally milk, and flavouring substances. Thus they contain fatty substances which soften and melt between 30 and 35°C.

When articles which consist wholly or partly of these products are exposed to temperatures lying above the melting point of the fatty substances (i.e. temperatures occurring during the summer or in tropical countries), they tend to lose their original shape and appearance and become soft and unpleasant to handle. If they are wrapped, the entire surface of the article adheres to the wrapper.

In the case of chocolate coatings intended for enrobing articles such as biscuits, confectionery, etc., the content of fatty substances is greater than in, say, chocolate bars. For this reason these articles immediately lose their original appearance and are no longer suitable for consumption when they have been exposed to high temperatures.

Different processes have been proposed in order to avoid the said disadvantages, but the products obtained, although more resistant to the effects of high temperature, have an unpleasant taste, and a perceptibly coarser texture than that of normal chocolate. Furthermore, these processes are usually only applicable to chocolate containing milk.

In British Patent No. 1,000,159 there is described a process for producing heat resistant chocolate products which comprises mixing a conched chocolate mass containing crystallised sugar with a second mass in which at least a part of the sugar is in amorphous condition.

It has now been found that the procedure described in said British Patent may be considerably simplified, and furthermore that chocolate products of a varying degree of heat resistance may be obtained, by incorporating in a conched chocolate mass a small proportion of finely-ground amorphous sugar. The resulting products have a sugar skeleton of the type described in British Patent No. 1,000,159.

The present invention provides a process for producing heat resistant chocolate or confectionery products (as hereinafter defined) which comprises adding finely-ground amorphous sugar to a conched chocolate or confectionery mass containing sugar in crystalline form and fat, moulding the mass to form a shaped product, wrapping the shaped product in a hermetic wrapper and subjecting the wrapped product to a heat treatment which comprises maintaining the product at a temperature of between 20 and 35°C for a period of 10 to 60 days.

The expression "chocolate or confectionery products" as used herein means confectionery products consisting of or containing chocolate chocolate substitutes or white chocolate.

Preferably, the quantity of finely-ground amorphous sugar added to the conched chocolate mass represents from 1 to 10% of the weight of the chocolate.

As indicated above, the resulting chocolate product has a sugar skeleton which is unaffected by heat.

The mass of amorphous sugar may be prepared by conventional methods, for example by boiling a sugar syrup under vacuum or by preparing a butterscotch mixture which contains 5 to 10% by weight of fat. Preferably, a quantity of reducing sugar (invert sugar or dextrose) is added to the amorphous sugar as a stabiliser. The amorphous sugar: reducing sugar ratio may be between 70:30 and 90:10 parts by weight.

The amorphous sugar, optionally containing

[*Price 5s. 0d. (25p)*]

one or more reducing sugars as stabiliser, is finely ground, preferably to a particle size not exceeding 15 to 20 microns, this being the approximate particle size of the ingredients of the conched chocolate mass. In accordance with the present invention, it has been found that the heat resistant effect is directly related to the particle size of the amorphous sugar, that is, the finer the particles, the smaller is the quantity of ground amorphous sugar which needs to be added to the conched chocolate mass to obtain a specified degree of heat resistance.

By way of example, the relation between the granulometry of the ground amorphous sugar and the quantity necessary to obtain a specific degree of heat resistance (measured by penetrometry, cone 50 g and 90°, chocolate maintained at a temperature of 40°C for 1 hour) is expressed in the following table:

Heat resistance (Penetration in tenths of a millimetre)	55	55	55
Average granulometry of ground amorphous sugar (microns)	4.7	3.0	1.7
Specific surface area (m^2/g)	0.8	1.25	3.5
Quantity of ground sugar to be added (% of the mass of conched chocolate)	7	4	1.5

In carrying out the process according to the invention, the conched chocolate mass is prepared by conventional techniques up to moulding. As indicated, the finely-ground amorphous sugar is added to the mass of conched chocolate just before moulding, that is when the chocolate is still fluid. After the addition of amorphous sugar, the temperature of the mixture should not exceed 50°C, and is preferably maintained at below 40°C, so as to avoid premature hardening of the mass. The fat content is adjusted to obtain the desired viscosity for moulding, and this may be obtained by adding cocoa butter or a mixture of fats, up to a total fat content of about 36%. This percentage should not, in general, be exceeded, as otherwise the sugar particles become coated with a fatty film and thus cannot adhere together to form a sugar skeleton when the chocolate is subjected to the final heat treatment. If the final viscosity of the mass is too high, it may be lowered by adding up to 0.2% of lecithin. Thus the use of ground amorphous sugar having a very fine particle size is particularly advantageous in that it does not involve any substantial modifications in the formulae and manufacturing processes of the chocolate mass.

The process according to the invention may also be used for the production of articles based on chocolate substitute, that is products in which the cocoa butter is replaced by a vegetable fat extraneous to cocoa. In this case, the conched mass containing crystallised sugar is prepared as before, and finely-ground amorphous sugar is added before moulding.

In another embodiment of the invention the process is applied to the manufacture of a confectionery article known as "white chocolate" having improved resistance to high temperatures. This article is prepared by mixing finely ground amorphous sugar with a conched mass consisting of milk solids, sugar in crystallised form, cocoa butter, and optionally flavourings, nuts, almonds, etc., but without the addition of non-fat cocoa solids.

From the foregoing it will be seen that the invention provides a simple yet very effective process for producing chocolate and confectionery articles which are heat resistant to a high degree.

In the following Example, which illustrates a preferred embodiment of the process according to the invention, all parts and percentages are given by weight.

Example

A concentrated sugar syrup is prepared containing, on dry matter basis 82% sucrose and 18% of reducing sugars (for example invert sugar or commercial dextrose monohydrate) and boiled under vacuum until the moisture content is about 1 to 2%. The sugar is placed on water-cooled trays in order to bring its temperature down to about 80°C, and is then spread out in a layer not more than 5 mm thick. The amorphous sugar thus produced may be used immediately or stored in moisture-proof containers.

Alternatively the amorphous sugar may be in the form of a butterscotch composition, consisting of sucrose and reducing sugars, and fresh butter or another fat such as butter oil, cocoa butter, etc., representing between 5 and 10% of the total weight of the sugars. In preparing the butterscotch, the sugars are heated to a temperature of between 140 and 165°C before the fat is added, and the mixture is then cooled.

The amorphous sugar, obtained either from boiled syrup or butterscotch is broken up and comminuted in a hammer mill to a particle size between 100 and 150 microns. This coarse powder is then very finely ground in an apparatus known as a "Micronisor" (Pennsalt Ltd.) ("Micronised" is a Registered Trade Mark). The size of the particles is between 1 and 2 microns (specific surface

area 3.0 to 3.5 m^2/g). The grinding operations are carried out in a room in which the relative humidity is maintained at 20±5% and the temperature kept constant at 20± 5°C.

Three parts of the finely-ground amorphous sugar are mixed with 100 parts of conched chocolate which has a suitable viscosity (about 35 poises). During this operation, and in subsequent steps of the process, the temperature of the mixture is maintained below 50°C. The mass is then tempered at a temperature of about 30°C, moulded, cooled to a temperature of between 15 and 5°C and the shaped articles wrapped in hermetic wrappers.

The last operation of the process, which completes the development of heat resistance in the shaped article consists of storing the wrapped chocolate in a dry room where the temperature is kept constant at 25°C for 20 to 30 days.

The distinctive nature of heat resistant chocolate manufactured according to the invention may be demonstrated by a simple test, which consists of immersing a piece of the chocolate in ether for several hours.

A piece of chocolate manufactured by conventional methods, in which the structure is based on the solidification of the fatty substances will collapse completely because of the extraction of the fatty substances by the solvent.

A piece of heat resistant chocolate obtained by the process of the present invention, in which the structure is based on a homogeneous skeleton of sugar particles, remains practically intact after prolonged immersion in ether.

When a piece of chocolate which is only superficially heat resistant, that is one having only a heat resistant outer layer or skin surrounding a more or less large centre which is not heat resistant is subjected to the ether test, it is observed that only the outer layer is unaffected by the solvent whereas the centre is dissolved.

It should be understood that the present invention is not limited to the conditions described above. For example, the finished product may be a plain or dark chocolate, a milk chocolate or a chocolate containing nuts, a chocoalte substitute or a "white chocolate". It may also contain fruit, cereals, etc. The milk chocolate may be manufactured with full cream milk powder, skimmed milk powder, condensed milk, crumb, etc. Whether the chocolate is plain or contains milk or nuts, it may be used for coatings as well as moulded articles of all descriptions.

WHAT WE CLAIM IS:—

1. A process for producing heat resistant chocolate or confectionery products (as hereinbefore defined) which comprises adding a finely-ground amorphous sugar to a conched chocolate or confectionery mass containing sugar in crystalline form and fat, moulding the mass to form a shaped product, wrapping the shaped product in a hermetic wrapper and subjecting the wrapped product to a heat treatment which comprises maintaining the product at a temperature of between 20 and 35°C for a period of 10 to 60 days.

2. A process according to claim 1, in which the quantity of finely ground amorphous sugar corresponds to 1 to 10% by weight of the conched mass.

3. A process according to claim 1 or claim 2, in which the amorphous sugar contains a stabilising amount of a reducing sugar.

4. A process according to claim 3, in which the weight ratio of amorphous sugar to reducing sugar is between 70:30 and 90:10.

5. A process according to any one of the preceding claims, in which the amorphous sugar has an average particle size not exceeding 20 microns.

6. A process according to any one of the preceding claims, in which the amorphous sugar has a specific surface area of 3.0 to 3.5 m^2/g.

7. A process according to any one of the preceding claims, in which after addition of the amorphous sugar the temperature of the mass is maintained at below 50°C.

8. A process according to any one of the preceding claims, in which the wrapped product is maintained for 20 to 30 days at a temperature of 25°C.

9. A process according to any one of the preceding claims, in which the fat present in the confectionery mass is a fat extraneous to cocoa.

10. A process according to any one of the preceding claims, in which the confectionery mass contains no non-fat cocoa solids.

11. A process according to claim 1, substantially as herein described.

12. A heat-resistant product obtained by a process according to any one of the preceding claims.

ELKINGTON and FIFE,
Chartered Patent Agents,
High Holborn House,
52—54, High Holborn,
London W.C.1.
Agents for the Applicants

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